

Applicant : Graeme C. McKinnon
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Filed : August 10, 2000
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Attorney's Docket No.: 10527-651RE1 / PC8721B

REMARKS

Claims 1-50 and 52-69 are pending. Claims 28, 29, 40, 42, 49, 50, 52, 54, 56 and 59 are amended. Claim 51 is cancelled. The Examiner rejected claims 28-34, 40-50 and 53-64 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,347,221 ("Rubinson"). The applicant respectfully traverses the rejections and requests reconsideration in view the following amendments and remarks.

I. Specification

The Examiner objected to the title of the application and required a new title that is clearly indicative of the invention to which the claims are directed. The title has been amended to overcome the Examiner's objection.

II. The §103(a) Rejections

The Examiner rejected claims 28-34, 40-50 and 53-64 under 35 U.S.C. 103(a) as being unpatentable over Rubinson.

Claims 28-39

Claim 28, as amended, recites a medical apparatus for imaging a wall of a body cavity in a patient by interacting with a magnetic resonance imaging (MRI) system which generates a magnetic field gradient and electromagnetic (EM) radiation externally from the patient and transmits the gradient and EM radiation into the patient and receives a response signal indicative of a resonant response from the patient. The apparatus includes an antenna including an open conductor length configured to be inserted into the cavity and provide the response signal, based on the resonant response from a region of the patient closely proximate the antenna, to the MRI system. The open conductor length includes at least one open ended conductive element. The apparatus further includes a controller coupled to the antenna and configured to receive the response signal to obtain an image of the cavity wall proximate the antenna.

Rubinson does not disclose an apparatus including an antenna as recited in claim 28. First, the probe disclosed in Rubinson generates a magnetic field gradient and EM radiation

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internally to the patient. By contrast, the antenna recited in claim 28 interacts with an MRI system that generates EM radiation externally from the patient.

Second, the apparatus recited in claim 28 requires an antenna including an open conductor length, where the open conductor length includes at least one open ended conductive element. Robinson does not disclose an antenna having an open conductor length. By contrast, Robinson discloses a probe including inner and outer conductors that are electrically short circuited to one another by a plug at a distal end of the probe (Col. 5, lines 45-47). Referring to Robinson's Figure 1, the probe 10 includes a central conductor 16 that is electrically connected to a conductor 26 extending from a connector 14, so an electrical path is provided from the conductor 26 through the central conductor 16 to the plug 18 and the outer conductor 12 back to the shell of the connector 14. The inner and outer conductors of the probe 10 are electrically short circuited to one another by the plug 18. Accordingly, the inner and outer conductors are not open ended conductive elements; the plug 18 creates a closed ended conductive path. A radio frequency or microwave frequency pulse may then be transmitted down the central conductor of the probe to generate a magnetic field in the vicinity of the short circuited end of the probe (Col. 9, lines 19-22).

Thus, not only does Robinson not disclose an antenna having an open conductor length including at least one open ended conductive element, Robinson actually teaches away from this. Robinson's probe includes inner and outer conductors that short circuit by a plug at the distal end of the probe. Accordingly, Robinson fails to disclose the limitations of claim 28, which is therefore in condition for allowance.

Claims 29-39 depend from claim 28 and are therefore allowable for at least the same reasons as claim 28.

Claims 40-48

Claims 40 recites a method of generating an image of a wall of a body cavity in a patient. The method includes inserting an antenna including an open conductor length into the cavity, where the open conductor length includes at least one open ended conductive element, and generating a magnetic field gradient and EM radiation external from the patient. As discussed

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above in reference to claim 28, Robinson discloses a probe that generates a magnetic field gradient and EM radiation internal to a patient, and does not include at least one open ended conductive element. Accordingly, claim 40 is allowable over Robinson. Claims 41-48 depend from claim 40 and are therefore allowable for at least the same reasons as claim 40.

Claim 49

Claim 49 recites a method of generating an image of a blood vessel wall of a blood vessel in a patient. The method includes inserting an antenna including an open conductor length into the blood vessel, where the open conductor length includes at least one open ended conductive element. A magnetic field gradient and EM radiation is generated external from the patient. As discussed above in reference to claim 28, Robinson discloses a probe that generates a magnetic field gradient and EM radiation internal to a patient, and does not include at least one open ended conductive element. Accordingly, claim 49 is allowable over Robinson.

Claims 50 and 52-53

Claim 50 recites a medical apparatus for imaging a blood vessel wall by interacting with an MRI system which generates a magnetic field gradient and EM radiation external from the patient. The apparatus includes an antenna having an open conductor length including at least one open ended conductive element. As discussed above in reference to claim 28, Robinson discloses a probe that generates a magnetic field gradient and EM radiation internal to a patient, and does not include at least one open ended conductive element. Accordingly, claim 50 is allowable over Robinson. Claims 52-53 depend from claim 50 and are therefore allowable for at least the same reasons as claim 50.

Claims 54-55

Claim 54 recites a medical apparatus for imaging a body cavity wall of a body cavity of a patient by interacting with an MRI system which generates a magnetic field gradient and EM radiation external from the patient. The apparatus includes an MRI antenna configured to be inserted into the body cavity, and includes an open conductor length having at least one open ended conductive element. As discussed above in reference to claim 28, Robinson discloses a probe that generates a magnetic field gradient and EM radiation internal to a patient, and does

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not include at least one open ended conductive element. Accordingly, claim 54 is allowable over Robinson. Claim 55 depends from claim 54 and is therefore allowable for at least the same reasons as claim 54.

Claims 56-64

Claim 56 recites a method of generating an image of a wall of a body cavity in a patient. The method includes inserting an MRI antenna into the body cavity, the antenna including an open conductor length having at least one open ended conductive element. As discussed above in reference to claim 28, Robinson discloses a probe that does not include at least one open ended conductive element. Accordingly, claim 56 is allowable over Robinson. Claims 57-64 depend from claim 56 and are therefore allowable for at least the same reasons as claim 56.

III. The Objected to Claims

The Examiner objected to claims 29, 30, 42, 45 and 59 for informalities. Claims 29, 42 and 59 are amended and are in condition for allowance. With respect to claims 30 and 45, the applicant respectfully submits that an image can be measured, and it would be clear to a person of skill in the art how to measure an image. Claims 30 and 45 are therefore also in condition for allowance.

IV. The Allowable Subject Matter

Claims 1-27 and 65-69 are allowable. Claims 35-39 and 52 are objected to as being dependent upon a rejected base claim. In view of the amendments and remarks above, the applicant respectfully submits that claims 35-39 and 52 are in condition for allowance.

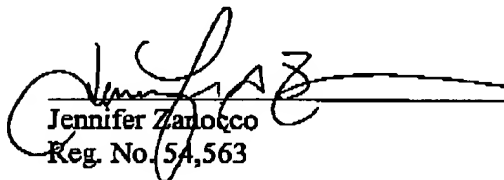
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No fees are believed due. However, please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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